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☐	L1	5227016.pn. or 5817182.pn.	2

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L5: Entry 130 of 132 File: USPT May 11, 1976

DOCUMENT-IDENTIFIER: US 3956147 A
TITLE: Production of metal fluorides from fluosilicic acid

Abstract Text (1):
A process which comprises reacting at a temperature above 100.degree.C. a metal oxide, hydroxide or a mixture thereof with aqueous fluosilicic acid, said fluosilicic acid having a concentration of about 10 to 45% by weight, to form gaseous silicon tetrafluoride and the corresponding metal fluoride and recovering said metal fluoride from the reaction medium.

Brief Summary Text (4):
The present invention relates to a process for directly reacting an aqueous fluosilicic acid with a metal oxide compound to form the corresponding metal fluorides, which is free or substantially free from the disadvantages referred to above. The process according to the invention is characterised by the fact that the aqueous fluosilicic acid and the metal oxide compound are reacted at an elevated temperature such as at least 60.degree.C and corresponding pressure to form the corresponding metal fluorides, the reaction being accompanied by the liberation of gaseous silicon tetrafluoride. Following conversion into fluosilicic acid, the silicon tetrafluoride may optionally be reused as starting material.

Brief Summary Text (9):
The fluosilicic acids are used in any concentration, preferably being used with a concentration of about 10 to 45% by weight. Metal oxide compounds which give metal fluorides, metal oxyfluorides or metal hydroxyfluorides or mixtures thereof, can be used as the metal oxide compounds. In accordance with the invention, these compounds are referred to hereinafter as metal fluorides. The metal oxide compounds can be used in the form of their hydroxides, oxides, carbonates or mixtures thereof. In accordance with the invention, they are referred to as metal oxide compound. The oxidic compounds of aluminium and, optionally, of calcium as well are preferably reacted by the process according to the invention to form the corresponding fluorides because, under the reaction conditions, these compounds form substantially insoluble fluorides which can readily be separated off from the liquid reaction medium. However, it is also possible to use other metal oxide compounds which initially form soluble fluorides. To separate these fluorides, the reaction medium initially has to be concentrated by evaporation. In general, it is possible in this way to obtain the fluorides of the elements Li, Mg, Ca, Sr, Ba, Ra, Al, V, Mn, Cr, Fe, Co, Ni, the rare earths and actinides (especially UF.sub.4). Especially preferred metals include Al, Ca, Cr and U.

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Brief Summary Text (10):
If these fluorine compounds are intended to be as free from silica as possible, it is necessary to use an excess of fluosilicic acid beyond the stoichiometry indicated in equation (1). 1 to 20% stoichiometric excess, based on said metal oxide, is preferred.

Brief Summary Text (12):
As already mentioned, the gaseous silicon tetrafluoride liberated during the reaction is preferably recycled. For this purpose, the silicon tetrafluoride can be hydrolyzed in aqueous medium to form fluosilicic acid and solid silicon dioxide, and the fluosilicic acid formed is returned to the process following separation of the silicon dioxide by filtration or decantation. In a particularly preferred embodiment, the silicon tetrafluoride formed is hydrolysed with most of the filtrate obtained during separation of the metal fluoride to form fluosilicic acid and solid silicon dioxide and the fluosilicic acid can then be reused as starting material following separation of the SiO.sub.2.

Brief Summary Text (13):
In cases where the fluosilicic acid is worked up during the phosphate disintegration process, the filtrate obtained during separation of the metal fluoride can advantageously be used as washing solution for the fluorine-containing spent gases and, in this way, can be re-enriched with fluosilicic acid and hydrofluoric acid. In this embodiment, it is also possible to channel the silicon tetrafluoride blown off from the pressure reaction into the spent-gas wash and to react it there to form fluosilicic acid. Apart from the metal fluoride, no waste products are formed in this process because all the secondary products are recycled.

Brief Summary Text (15):
The process according to the invention is described in more detail in the following with reference to the production of aluminium fluoride. The following description applies similarly to the production of the other metal fluorides.

Brief Summary Paragraph Equation (1):
MeO + H.sub.2 SiF.sub.6 .fwdarw. MeF.sub.2 + SiF.sub.4 + H.sub.2 O 1

Detailed Description Text (1):
In the embodiment illustrated in the FIGURE, the aqueous H.sub.2 SiF.sub.6 -containing solution is initially combined with the fluosilicic-acid-containing solution coming from the filter 8 and fed with aluminium hydroxide into the autoclave where the following reaction takes place: ##EQU1##

CLAIMS:

1. A process which comprises heating a metal oxide, hydroxide or mixture thereof wherein the metal is selected from the group consisting of aluminum, calcium, chromium and uranium in aqueous fluosilicic acid, to about 140.degree. to 240.degree.C at a pressure of from 5 to 30 atmospheres gauge, said fluosilicic acid having a concentration of about 10 to 45% by weight and being present in a 1 to 20% stoichiometric excess, based on the metal oxide, hydroxide or mixture thereof, whereby silicon tetrafluoride is removed from said fluosilicic acid in gaseous form and the remaining hydrogen fluoride in

said aqueous solution forms the corresponding metal fluoride and recovering said metal fluoride from the reaction mixture.

2. The process of claim 1 wherein the gaseous silicon tetrafluoride is hydrolyzed in an aqueous medium to silicon dioxide and aqueous fluosilicic acid and the latter is utilized as aqueous fluosilicic acid reactant to produce said corresponding metal fluoride.

3. The process of claim 1 wherein said reaction mixture contains suspended metal fluoride and aqueous fluosilicic acid and said aqueous fluosilicic in said reaction mixture is utilized as aqueous fluosilicic acid reactant to produce said corresponding metal fluoride.

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Inventor Name Search Result

Your Search was:

Last Name = RUUD
First Name = JAMES

Application#	Patent#	Status	Date Filed	Title	Inventor Name 23
10605858	Not Issued	019	10/31/2003	DIFFUSION COATING PROCESS	RUUD, JAMES ANTHONY
10459805	Not Issued	041	06/13/2003	PROCESS FOR REPAIRING TURBINE COMPONENTS	RUUD, JAMES ANTHONY
10420265	Not Issued	030	04/22/2003	IN-SITU METHOD AND COMPOSITION FOR REPAIRING A THERMAL BARRIER COATING	RUUD, JAMES A.
10376772	Not Issued	030	02/28/2003	METHOD FOR CHEMICALLY REMOVING ALUMINUM-CONTAINING MATERIALS FROM A SUBSTRATE	RUUD, JAMES ANTHONY
10325475	Not Issued	030	12/19/2002	AIRFOIL REFURBISHMENT SYSTEM	RUUD, JAMES ANTHONY
10294727	Not Issued	030	11/15/2002	SELECTED BINDER METHOD, ARTICLE AND SYSTEM	RUUD, JAMES A.
10286774	Not Issued	160	11/04/2002	METHOD AND APPARATUS FOR STRIPPING OXIDATION-RESISTANT COATINGS	RUUD, JAMES ANTHONY

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				FROM GAS TURBINE COMPONENTS	
10281544	Not Issued	041	10/28/2002	CERAMIC MASKING MATERIAL AND APPLICATION METHOD FOR PROTECTING TURBINE AIRFOIL COMPONENT SURFACES DURING VAPOR PHASE ALUMINIDING	RUUD, JAMES
10268420	Not Issued	020	10/10/2002	HIGH-THROUGHPUT SYSTEMS AND METHODS FOR THE FABRICATION AND OPTIMIZATION OF MATERIALS AND COMPONENTS FOR SOLID OXIDE FUEL CELLS	RUUD, JAMES
10249564	Not Issued	040	04/18/2003	NICKEL ALUMINIDE COATING AND COATING SYSTEMS FORMED THEREWITH	RUUD, JAMES ANTHONY
10126349	6605258	150	04/22/2002	HIGH THROUGHPUT SCREENING METHOD, ARRAY ASSEMBLY AND SYSTEM	RUUD, JAMES ANTHONY
10063178	Not Issued	030	03/28/2002	METHOD FOR PROCESSING ACID TREATMENT SOLUTION, SOLUTION PROCESSED THEREBY, AND METHOD FOR TREATING ARTICLES THEREWITH	RUUD, JAMES ANTHONY
09773152	6607918	150	02/01/2001	FLUORESCENT LABELING METHOD AND SUBSTRATE	RUUD, JAMES ANTHONY
09771186	Not Issued	071	01/29/2001	METHOD FOR REMOVING OXIDES AND COATINGS FROM A SUBSTRATE	RUUD, JAMES ANTHONY
09683385	Not Issued	094	12/20/2001	THERMAL BARRIER COATINGS,	RUUD, JAMES ANTHONY

				COMPONENTS, METHOD AND APPARATUS FOR DETERMINING PAST-SERVICE CONDITIONS AND REMAINING LIFE THEREOF	
09682862	Not Issued	092	10/25/2001	PROCESS FOR PARTIAL STRIPPING OF DIFFUSION ALUMINIDE COATINGS FROM METAL SUBSTRATES, AND RELATED COMPOSITIONS	RUUD, JAMES ANTHONY
09682620	6599416	150	09/28/2001	METHOD AND APPARATUS FOR SELECTIVELY REMOVING COATINGS FROM SUBSTRATES	RUUD, JAMES ANTHONY
09682282	6644917	150	08/14/2001	SMART COATING SYSTEM WITH CHEMICAL TAGGANTS FOR COATING CONDITION ASSESSMENT	RUUD, JAMES ANTHONY
09682034	6544351	150	07/12/2001	COMPOSITIONS AND METHODS FOR PRODUCING COATINGS WITH IMPROVED SURFACE SMOOTHNESS AND ARTICLES HAVING SUCH COATINGS	RUUD, JAMES ANTHONY
09666381	6420178	150	09/20/2000	HIGH THROUGHPUT SCREENING METHOD, ARRAY ASSEMBLY AND SYSTEM	RUUD, JAMES ANTHONY
09591531	Not Issued	071	06/09/2000	METHOD FOR REMOVING A COATING FROM A SUBSTRATE, AND RELATED COMPOSITIONS	RUUD, JAMES ANTHONY
09411209	6299935	150	10/04/1999	METHOD FOR FORMING A COATING BY USE OF	RUUD , JAMES ANTHONY

				AN ACTIVATED FOAM TECHNIQUE	
09362596	6352406	150	07/28/1999	METHOD FOR ASSESSING QUALITY OF A COATING PROCESS AND ASSEMBLY THEREFOR	RUUD , JAMES ANTHONY

Inventor Search Completed: No Records to Display.

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Inventor Name Search Result

Your Search was:

Last Name = KOOL
First Name = LAWRENCE

Application#	Patent#	Status	Date Filed	Title	Inventor Name 18
10633888	Not Issued	030	08/04/2003	ALUMINIZING SLURRY COMPOSITIONS FREE OF HEXAVALENT CHROMIUM, AND RELATED METHODS AND ARTICLES	KOOL, LAWRENCE BERNARD
10633887	Not Issued	019	01/01/0001	ORGANIC COATING COMPOSITIONS FOR ALUMINIZING METAL SUBSTRATES, AND RELATED METHODS AND ARTICLES	KOOL, LAWRENCE
10462049	Not Issued	030	06/16/2003	PROCESS FOR REMOVING CHROMIDE COATINGS FROM METAL SUBSTRATES, AND RELATED COMPOSITIONS	KOOL, LAWRENCE BERNARD
10376772	Not Issued	030	02/28/2003	METHOD FOR CHEMICALLY REMOVING ALUMINUM-CONTAINING MATERIALS FROM A SUBSTRATE	KOOL, LAWRENCE BERNARD
10294727	Not Issued	030	11/15/2002	SELECTED BINDER METHOD, ARTICLE AND	KOOL, LAWRENCE B.

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				SYSTEM	
10286774	Not Issued	160	11/04/2002	METHOD AND APPARATUS FOR STRIPPING OXIDATION-RESISTANT COATINGS FROM GAS TURBINE COMPONENTS	KOOL, LAWRENCE BERNARD
10280215	Not Issued	041	10/25/2002	SYSTEMS AND METHODS FOR ESTIMATING EXPOSURE TEMPERATURES AND REMAINING OPERATIONAL LIFE OF HIGH TEMPERATURE COMPONENTS	KOOL, LAWRENCE
10277279	Not Issued	030	10/21/2002	PROCESS FOR REMOVING ALUMINOSILICATE MATERIAL FROM A SUBSTRATE, AND RELATED COMPOSITIONS	KOOL, LAWRENCE BERNARD
10063178	Not Issued	030	03/28/2002	METHOD FOR PROCESSING ACID TREATMENT SOLUTION, SOLUTION PROCESSED THEREBY, AND METHOD FOR TREATING ARTICLES THEREWITH	KOOL, LAWRENCE BERNARD
10063087	Not Issued	092	03/18/2002	APPARATUS AND METHOD FOR REJUVENATING COOLING PASSAGES WITHIN A TURBINE AIRFOIL	KOOL, LAWRENCE BERNARD
09771186	Not Issued	071	01/29/2001	METHOD FOR REMOVING OXIDES AND COATINGS FROM A SUBSTRATE	KOOL, LAWRENCE BERNARD
09682862	Not Issued	092	10/25/2001	PROCESS FOR PARTIAL STRIPPING OF DIFFUSION ALUMINIDE COATINGS	KOOL, LAWRENCE BERNARD

				FROM METAL SUBSTRATES, AND RELATED COMPOSITIONS	
09682620	6599416	150	09/28/2001	METHOD AND APPARATUS FOR SELECTIVELY REMOVING COATINGS FROM SUBSTRATES	KOOL, LAWRENCE BERNARD
09591531	Not Issued	071	06/09/2000	METHOD FOR REMOVING A COATING FROM A SUBSTRATE, AND RELATED COMPOSITIONS	KOOL, LAWRENCE BERNARD
07249592	4845181	150	09/26/1988	ORGANIC CONDENSATION POLYMERS AND METHOD OF MAKING SAME	KOOL , LAWRENCE B.
07114656	Not Issued	161	10/28/1987	ORGANIC CONDENSATION POLYMERS AND METHOD OF MAKING SAME	KOOL , LAWRENCE B.
06194134	4327192	150	10/06/1980	METHOD OF FABRICATING NESTED SHELLS AND RESULTING PRODUCT	KOOL , LAWRENCE B.
06106132	4405373	150	12/21/1979	METHOD OF ALTERING THE EFFECTIVE BULK DENSITY OF SOLID MATERIAL AND THE RESULTING PRODUCT	KOOL , LAWRENCE B.

Inventor Search Completed: No Records to Display.

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